

implications for understanding the later settlement of Japan, the peopling of Polynesia and the Americas, and the explanation of Australian Aboriginal dental morphology, while arguably simplistic, are summarized here. The last half of this chapter (global analysis) which presents the results of three new analyses of dental non-metric traits, apparently for the first time, should be viewed as a "work-in-progress" and would have benefited from some "peer review cleansing" in a refereed journal before being presented here. Several incredible associations, staunchly defended by the authors, caught this reviewer's eye, such as the placement of Polynesians in the same cluster with Australian Aborigines, Africans, and Europeans, and one of the biggest oddities, New Guinea's affinity to Western Eurasia rather than with Australians and Melanesians! Given the problems of sampling alluded to earlier, these results may not be so odd. Although limited comparisons with craniometric and genetic data are made, there

are no comparisons with odontometric data in this chapter.

Only a few obvious typographical errors were spotted. One unfortunate error occurs on p. 297 where Sangvichien is misspelled and, as far as this reviewer is aware, there are no publications (in English) in 1983 for this researcher.

Overall, this is a well produced and handsome volume on dental anthropology (one of a series in the Cambridge Studies in Biological Anthropology series), which focuses on dental non-metric variation and spotlights the work of Christy Turner II and the ASU dental anthropology program. While flawed, I highly recommend it for dental anthropologists and those interested in human variation.

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GREAT APE SOCIETIES. Edited by W.C. McGrew, Linda F. Marchant, and Toshisada Nishida. New York: Cambridge University Press. 1996. 328 pp. ISBN 0-521-55494-2. \$64.95 (cloth).

This edited volume not only reflects but gives added depth to the 1994 Wenner-Gren conference, The Great Apes Revisited, held in Baja California Sur, Mexico. Forty primatologists (nearly twice as many as actually participated in the conference) contributed 21 engaging and challenging articles to this collection.

The editors draw interesting comparisons, in their introduction, between the Baja conference and its ancestral counterpart held in Austria in 1974, the latter resulting in the edited volume *The Great Apes* (Hamburg and McCown, 1979). For example, they point out that at the 1974 meeting no papers discussed either bonobos or lowland gorillas, little then being known about them. Instead, most presentations were on orangutans or

the eastern subspecies of chimpanzee (*Pan troglodytes schweinfurthii*). Now, 20 years later, much has been discovered about bonobos and lowland gorillas, as well as the other two chimpanzee subspecies, while the number of orangutan studies have diminished. The editors also point out that at the first conference, prior to the emergence of other issues such as sociobiology and social cognition, "ape language" was a major topic. In addition, whereas past field studies were primarily surveys of natural history, such research now most often concentrates on sex and reproduction, feeding ecology, social relations, and ranging (Hebert and Courtois, 1994). Finally, the editors note how the number of women and European and Japanese participants has increased. Only Louis Leakey's three female protégées were present at the 1974 conference, while in 1994 women comprised 40% of the participants.

No book on nonhuman primates these days is complete without mention of primate conservation. Although no articles in this

volume consider issues of conservation, the Forward, written by Jane Goodall, is dedicated completely to issues of conserving primate populations, primarily those of chimpanzees. Most importantly, she points out what every field primatologist is learning: that we cannot avoid becoming involved in conservation efforts ourselves.

Because great apes are our closest living relatives, understanding their behavioral ecology, social life, and cognitive abilities is essential for students and researchers of anthropology and psychology. *Great Ape Societies* is centered on these themes. Its first three sections present information on socioecology and social relationships, while Part Four considers the "ape mind" and its cognitive abilities. Part Five is given to comparative studies, and Part Six discusses apes as models for reconstructing early human patterns. Perhaps because the book's editors are all prominent chimpanzee researchers, and because chimpanzees remain the most widely studied great ape, they are favored by the greatest number of contributions (more than half) to the volume.

The list of contributing authors is impressive and predominated by field-researchers, although a few consider the behavior of captive apes. Despite their general overrepresentation, chimpanzee studies are neglected in the overview chapters presented in Part One. Three chapters in this section concentrate on ecological and social explanations of the different social systems found in orangutans, gorillas, and bonobos. In their chapter on orangutan social systems, Carel van Schaik and Jan van Hooff review three competing models and conclude that two are equally supported by current data (Rodman and Mitani's roving-male promiscuity model and Mackinnon's community model). The other two articles could not have been written 10 years ago, neither David Watts's review of the socioecology of the three gorilla subspecies nor Frances White's comparative review of bonobos from the varied field sites studied.

Two of Part Two's four chapters center on the sympatric relationship between lowland gorillas and chimpanzees, one by Suehisa Kuroda and colleagues on western lowland gorillas (*Gorilla gorilla gorilla*) and chimpanzees (*Pan t. troglodytes*) in Ndoki Forest,

Congo and another by Juichi Yamagiwa et al. on eastern lowland gorillas (*Gorilla g. graueri*) and eastern chimpanzees (*Pan t. schweinfurthi*) in Kuhuza-Biega, Zaïre. The next conference will surely include research on apes from the Bwindi-Impenetrable Forest, Uganda, the only place where mountain gorillas (*Gorilla g. beringei*) and eastern chimpanzees (*Pan t. schweinfurthi*) are sympatric. How the behavioral and socioecology of sympatric populations differ from allopatric populations is a hot topic at present and continues to gather momentum. In addition to these sympatric studies, Richard Wrangham and his colleagues discuss the ecological factors responsible for differences among great apes, especially with reference to chimpanzees in Kanyawara, Uganda, and Caroline Tutin presents some of the first evidence of how the frugivorous nature of western lowland gorillas influences their ranging patterns.

Part Three discusses social relations within chimpanzee and bonobo groups. Information on other great apes is missing from this section. Two contributions on chimpanzees come from long-term research sites in Tai Forest, Ivory Coast and in the Mahale Mountains, Tanzania. Christoph Boesch shows that hunting, fruit availability and sexual opportunities all combine to explain most of the party-size variation observed in Tai Forest chimpanzees. He also suggests that sexual bonds, being more common between the sexes, are more similar to those of bonobos than to the male-male bonds seen in Gombe chimpanzees. Mahale males, as discussed by Toshisada Nishida and Kazuhiko Hosaka in their chapter on coalition formation, exemplify an intermediate position between the strict male bonds of Gombe and the bisexual bonds of Tai. The remaining two contributions in this section are on chimpanzee and bonobo copulatory behavior, with articles by Takayoshi Kano and by Ykio Takahata and others.

Part Four discusses the mind of great apes. In his chapter on conflict as negotiation, Frans de Waal prompts us to think beyond the immediate dyadic relationship between individuals, considering instead the long-term relations and "expectations" of the actors themselves. In other words, each individual "has a set of predictions about the

other's behavior, deviations from which may prompt adjustment of their own attitude" (p. 169). Charlotte Hemelrijk's chapter on reciprocity complements this theme. In two articles on chimpanzee and bonobo intelligence, Sue Savage-Rumbaugh and her colleagues consider ape language experiments and Tetsuro Matsuzawa examines symbol and tool use. Having long conducted language experiments on captive apes, Savage-Rumbaugh et al. recount their efforts in the field to discover whether the failure of wild-ape studies to find examples of symbolic communication owes to 1) scientists' reluctance to report what they see, or to 2) apes having no such system. Their provisional conclusion is that bonobos *do* have such a system and use vegetation in an intentionally symbolic manner.

In the following section (Part Five), William McGrew and Linda Marchant's chapter on laterality in hand use and John Mitani's on African ape vocal behavior continue this comparative perspective on the ape mind. The remaining two chapters are similarly comparative, Diane Doran's on positional behavior and Barbara Fruth and Gottfried Hohmann's on nest-building behavior.

Part Six considers great apes as models for ourselves. I read Jim Moore's article fully expecting to find a review of chimpanzee models for reconstructing the behavior of our early ancestors, but in addition I found an innovative and challenging critique of "what a model is," and better yet, "what it is not." Moore advocates a referential approach in which "the model is not a single typological modern species per se, but the

set of differences observed between populations" (p. 285). Adrienne Zihlman, in her chapter on chimpanzee models, suggests several features favoring a *Pan paniscus* model for early human origins. Finally, Junichiro Itani's Afterword, "A New Milestone in Great Ape Research," concludes and summarizes the volume with an interesting historical perspective on primatology.

The book contains a valuable Appendix of great ape study sites. The information on each of the 18 study-site reports include information on location, climate, vegetation, human influence, predators, conservation efforts, other primates present, and current research interests. This is an excellent resource for those interested in comparative study.

As richly evidenced by this volume, one must be impressed by the steep trajectory of great ape research over the past 20 years. Although it is exciting to project what the year 2014 may hold in store, we can only hope that the orangutans—those facing slaughter as they flee Indonesian fires—and the chimpanzees and gorillas—those facing decimation by the African bushmeat crisis—will survive as resources for our continued learning.

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FROM LUCY TO LANGUAGE. By Donald Johanson and Blake Edgar. Prospect Heights, IL: Simon and Schuster. 1996. 272 pp. ISBN 0-684-81023-9 \$50.00 (cloth).

This book does not begin with Lucy or end with language. In fact, neither figures prominently in the text nor in the gallery of photographs which fill the pages. The text recognizes *Ardipithecus* as the first homi-

nid, states that language probably existed in Neanderthals, and ends with a photograph of a Magdalenian harpoon. A better title might be "From *Ardipithecus* to the Upper Paleolithic," but this lacks the ring of their title and does not recognize the senior author's discovery at Hadar.

The book is divided in two parts. The first, called "Central Issues of Paleoanthropology," deals with a wide range of subjects